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CAUSES, EFFECTS AND
TREATMENT.

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347

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MOUTH-BREATHING—ITS CAUSES, EFFECTS AND TREATMENT.*

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As you are all aware, the subject assigned to me for presentation at this meeting is "Mouth-Breathing." A subject about which so little has been written, that it is fair to assume that the pernicious effects of the habit are but little appreciated by the medical profession, and, naturally, those conditions of which medical men take little or no notice, as detrimental to health, will scarcely be thought injurious by the laity; and so it is that at the present day this baneful habit is allowed, with scarcely a warning voice from our guardians of health, as to the nature and extent of the evils resulting from its practice.

Mr. George Catlin was the first, I believe, to call attention to this subject. This he did in a very forcible manner, in a monograph entitled, "The Breath of Life," which was published in 1872. While his work can scarcely be called scientific, his denunciation of the habit of breathing through the mouth as a cause of loss of strength and many of the ills of mankind, especially in the growing age, has served largely in drawing the attention of medical scientists to the subject.

Dr. Clinton Wagner published last year a monograph entitled, "Habitual Mouth-Breathing," in which the subject is carefully considered.

In the January number of the *American Journal of Obstetrics*

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of this year, Dr. R. C. Brandeis has an article on "Nasal Catarrh in the New Born: Its influence on Respiration and Nutrition." In this paper the author clearly sets forth the effects of mouth-breathing upon very young children.

With the exception of the little that has been written on a branch of the subject, viz., the effect of mouth-breathig upon hearing, the above is all the literature of the subject of which I am aware.

In order to understand the abnormal, we must first know what the normal condition of a part should be; therefore, before entering upon a consideration of the conditions which give rise to mouth-breathing, let me remind you of the office of the nasal passages.

Besides being the seat of the sense of smell, these passages, in their normal condition, serve to warm, cleanse, and moisten the air inhaled into the lungs. The mucous membrane lining the nares presents a very extensive surface, and in a comparatively small space. It is richly supplied with blood, and on this account the nasal cavities are warmer by a degree or two than the cavity of the mouth. Air passing through the nose is therefore warmed before it reaches the throat. On the other hand, air passing through the mouth is not sufficiently warmed to be non-irritating till it reaches the trachea, perhaps even the bronchi.

Just within the nostrils are a number of hairs which, together with the cilia of the epithelium covering the mucous membrane of the nasal passages, serve to arrest and entangle particles of dust; thus the nose acts as an air-filterer. When respiration is carried on through the mouth, foreign particles are carried into the air-passages, and lodging on the mucous membrane covering the pharynx, larynx, trachea and bronchi, act as irritants.

The mucous membrane of the nasal cavities is supplied with a large number of follicular glands, the secretion from which serves to moisten the air passing through them, thus removing that quality of the air which, when breathed through the mouth for a length of time, causes irritation.

Air inspired through the nose passes through a refining process which prepares it for the lungs very much as mastication prepares food for the stomach. If food is improperly masticated, the stomach suffers. If air is improperly refined, the air-passages

suffer. The *nose* and not the *mouth*, was designed as the gateway to the lungs.

The conditions causing mouth-breathing are found in two situations—the nose and pharynx. We will consider them separately.

Nasal causes.—A deflected nasal septum though usually causing obstruction to but one passage, may be so curled upon itself as to impede respiration through both passages. The cartilaginous and bony portions of the septum are sometimes the seat of interstitial enlargement or outgrowth, which encroaching upon the calibre of the nares, causes partial or complete stenosis. Exostoses may spring from any portion of the bony framework of the nasal passages. They may attain great size, and of course impede nasal respiration. A variety of tumors are developed in the nasal cavities; of these, the gelatinous polypus is met with most frequently, and obstructs nasal respiration in proportion to the size and number of growths present. Foreign bodies may be lodged in the nasal passages, causing obstruction, and give rise to symptoms of nasal catarrh.

Hypertrophic nasal catarrh, is perhaps the most common cause of mouth-breathing. Hypertrophy of the mucous membrane lining the nasal passages, but more especially that enveloping the turbinated bones, has been found in the majority of cases of nasal catarrh which have come under my observation. The hypertrophy consists of an increase of all the normal elements of the mucous membrane; thus constituting a true hypertrophy. While the hypertrophy sometimes involves the membrane lining the nasal passages throughout, it is usually most marked on the convexity of the turbinated bones,

Frequently the hypertrophy is limited to certain localities. These points are the anterior and posterior ends of the inferior turbinated bones; and, of these, posterior hypertrophy is most frequently met with.

Anterior hypertrophy when examined with the aid of the speculum, presents the appearance of a smooth, or slightly mammillated growth, of a bright or pale-red color, attached by a broad base to the end of the inferior turbinated bone.

Posterior hypertrophy can of course be seen only by the aid of the rhinoscopic mirror. When of large size, it may fill up the posterior opening of the nasal passage of one side, and even reach

across the septum and cover part of the opening of the opposite passage. As the tissue of these growths has a hygroscopic character, their size will depend somewhat upon the condition of the atmosphere; being larger in damp than in dry weather.

I have here a sketch (Figure 1) taken from my case book, which shows hypertrophy of the tissues covering the posterior ends of the inferior turbinated bones. The larger growth was removed by Jarvis's operation, which will be described further on.

The most prominent symptoms of hypertrophic nasal catarrh are a more or less copious discharge of muco-pus flowing from the anterior nares, or down the throat from the posterior nares, or from both, according to the situation of the most active part of the disease; and, partial or complete obstruction to nasal respiration.

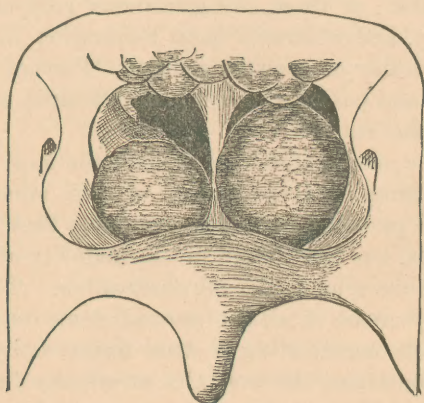


Fig. 1.

Pharyngeal causes.—One of the most prominent of these is retro-nasal adenoma. This consists of hypertrophy of the collection of adenoid tissue at the vault of the pharynx, sometimes spoken of as the pharyngeal tonsil, and the glandular tissue in its neighborhood. The mass may be simply an appreciable enlargement of the tonsil, or may be so large as to veil the posterior nares and pharyngeal mouths of the Eustachian tubes, causing nasal obstruction and deafness.

The condition of that part of the posterior pharyngeal wall which can be seen by direct illumination through the mouth, is never a reliable indication of the condition which may exist in the

upper pharyngeal space. The use of the rhinoscopic mirror, or the finger passed behind the velum to determine by the sense of touch, are the only reliable methods of examination.

It would scarcely be necessary for me to more than mention hypertrophy of the tonsils as a cause of mouth-breathing, were it not for the fact that they again are often the cause of nasal stenosis, and that therefore their removal is not always followed by a re-establishment of nasal respiration. If the tonsils are enlarged in childhood and continue a number of years, the nasal passages not being called upon to perform their natural function, either do not develop properly, or there is established a nasal catarrh with resulting thickening of the lining membrane. Therefore it is, that after removal of the tonsils, we occasionally find that the nasal canals are inadequate to pass to the lungs the requisite quantity of air.

Effects of Mouth-breathing.—Unless the nasal or pharyngeal obstruction is sufficiently great to necessitate the keeping of the mouth open at all times, this cause of disease will often be overlooked. The mouth may be closed on going to sleep, opened while sleeping, and when consciousness arrives, is closed again, and so many are ignorant of the fact that they ever breathe through the mouth. If these people are questioned closely, the fact will be elicited that the mouth and throat are always dry in the mornings, and that it may be several hours before this condition wears away.

In infants, when nasal respiration is impeded, the act of sucking is difficult, and, in some instances, impossible.

In young children nasal obstruction gives rise to impairment of health in proportion to the amount of stenosis present. In the normal condition of respiration, when the air passes through the nose, sufficient time is usually taken to properly masticate food, but when the nasal passages are blocked and respiration must be carried on through the mouth, during the process of mastication breathing is suspended. Under these circumstances, food is not properly subdivided, and in this condition is hurried on to the stomach. This necessitates extra labor on the part of that organ, which, together with the secretion from a nasal or pharyngeal catarrh, usually present in these cases, soon gives rise to gastric and intestinal disturbances.

When chronic enlargement of the tonsils is the cause of mouth-breathing in children, it is well known to us all that the chest is not developed as rapidly as the rest of the body. Pigeon-breast or sunken sternum are often the result. The air supply to the lungs is not sufficient to resist the external atmospheric pressure, and, as a natural consequence, the chest sinks in.

Effects upon Hearing.—Diseases of the ear may be caused in several ways. First—by direct pressure of the hypertrophied mass in the upper pharynx upon the mouths of the Eustachian tubes. Second—by extension of the catarrhal inflammation to the Eustachian tubes or cavities of the tympanum. Third—by obstructed nasal respiration. If the nasal passages are occluded the tympanic cavities are not properly ventilated. Under these circumstances the air in these cavities is rarified at each act of deglutition, and as a consequence the drumheads sink in and lose their elasticity. Again, in the acts of coughing, sneezing or blowing the nose, the air not finding sufficient exit through the nose is forced into the tympanic cavities, and being condensed there, gives rise to a condition directly opposite to that just described:—bulging outwards of the drumheads, and consequent loss of elasticity.

That enlarged tonsils are occasionally the cause of deafness, is shown by the fact that their removal will sometimes be followed by improvement or re-establishment of the hearing power.

Effects on the Voice.—The nasal cavities play a very important part as resonators in vocalization; when they are obstructed, this function is, of course, impaired in proportion to the degree of stenosis present. The loss of resonance together with the impossibility of pronouncing the nasal sounds m, n and ng, give rise to what Meyer calls the “*dead*” pronunciation or “*dead*” speech.

Nasal catarrh is present in the majority of cases of nasal stenosis; the acrid discharge flowing from the posterior nares into the pharynx, and from thence into the larynx, excites a catarrhal condition of the membranes of those parts; in other words, a pharyngitis and laryngitis. The fact that secretion from the nares does get into the laryngeal cavity, I have been able to demonstrate, and in the following manner: If a colored fluid is placed on the posterior wall of the pharynx in sufficient quantity to trickle down the membrane to the œsophageal opening, a laryngoscopic examination made a few minutes after the application, will show that some

of the fluid has passed over the arytenoid cartilages into the larynx.

Besides the conditions which I have spoken of as resulting from this baneful habit, the expression of the face is changed, in some instances simulating the idiot; and as the character of man is often judged by the expression of his face, it is important that the condition which causes it should if possible be removed, and, as I shall now proceed to show, this can often be accomplished.

Treatment.—Successful treatment of the conditions causing mouth-breathing in children is usually difficult and often impossible. When the obstruction is due to adenoid hypertrophy at the vault of the pharynx, it should be scooped out with the curette. If the condition is not great, scratching the surface with the nail of the index finger is often sufficient to destroy it. Brandeis reports most satisfactory results in several cases of hypertrophic nasal catarrh in infants, from cleansing the nasal cavities with solutions of sodium-bicarbonate or baracic acid, and afterwards applying a twenty-five per cent. solution of the permanganate of iron, by means of a cotton carrier.

Rectification of a deflected nasal septum can be accomplished in many ways. A hole can be punched through the septum at the most prominent portion of the bend, and a piece taken out. The protruding portion may be ground off with the dental engine, as proposed by Dr. Goodwillie. The mucous membrane may be dissected off, a portion of the cartilage chiseled out, the flap replaced and held in position by plugs of cotton. The cartilage may be divided by a stellated puncture, and then forcibly bent straight and kept so by the use of plugs, as recently suggested by Dr. Steele of St. Louis, or, the cartilage may be forcibly broken, bent straight and held in position by large plugs, as suggested by Mr. Adams. My only experience has been with Mr. Adams' operation. It is performed as follows: Whilst the patient is under an anæsthetic, a pair of strong forceps with straight parallel blades are introduced into the nose, one blade into each nostril, when the septum is grasped and forcibly broken. A retention apparatus, consisting of a steel screw compressor with two blades, is then introduced and the septum held in position for two or three days. Ivory or ebony plugs are then inserted and worn for two or three days longer. The plugs recently introduced by Dr. Steele are a great improvement upon those of Mr. Adams.

The advantages of this operation are, that the cartilage is not exposed to the air, and the support of the septum is not weakened.

I must confess that my results with this operation have not been entirely satisfactory, and though I have had no experience with Dr. Steele's operation, I am inclined to believe that it offers better prospects of success.

Nasal tumors can be removed with the wire snare, but better still with the polypus forceps. In cases where the nasal passages are very narrow, the blades of the ordinary polypus forceps will be found too thick to allow of free movement after they have been introduced into the nasal cavity. To obviate this difficulty I have had the blades of a pair of Duplay's polypus forceps ground down to half their original thickness. These have proven sufficiently strong and very serviceable.

In hypertrophic nasal catarrh when of long standing, and the thickening of the membrane is general and considerable, washes and sprays are of little use except to keep the parts clean. The tissue must be destroyed in order that free nasal respiration shall be established. This can best be done with caustics, or the galvano-cautery. Of the caustics, I prefer chromic and glacial acetic acids. Galvano-cautery if carefully applied, causes but little pain, though there is more or less inflammation and swelling for a few days following the application.

Hypertrophy of the tissues of the posterior end of the inferior turbinated bone, can best be removed with an exceedingly ingenious wire snare *écraseur*, devised by Dr. W. C. Jarvis, of New York.

The instrument is described by Dr. Jarvis, as follows :—

“The *écraseur* (fig. 2) consists of two metal canulæ; the large one is six inches in length and flexible; the smaller, about four inches long, slides freely upon that part of the main one nearest the operator. The surface of the main canula occupied by the secondary one is threaded for the movement on its surface of a milled nut. Wire is passed through the main canula and attached to two retention pins fixed to the proximal end of the small one. A slight indentation upon the small canula, fits a corresponding surface on the larger one. This arrangement prevents rotation of the secondary canula, and so overcomes the tendency of the wire to twist and become loosened from its attachment to the growth. The nut when turned pushes the outer canula before it, its speed

varying from an imperceptible advance, to a rapid motion along the thread."

In performing the operation the use of the rhinoscope is essential in order that the movements of the loop in the posterior nares may be watched.

The operation is performed as follows : The wire loop is bent slightly towards the side to which the hypertrophied mass is attached, and then the instrument is passed into the nasal passage. With the aid of the mirror in the fauces the loop is carefully guided until it is seen to encircle the growth, when it is drawn

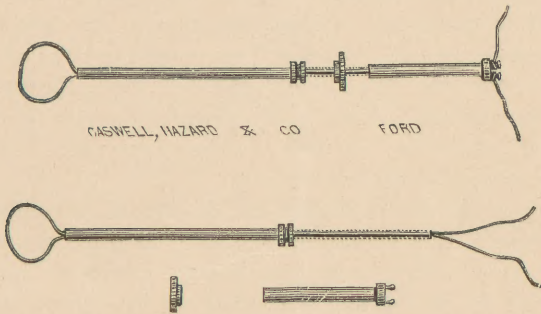


Fig. 2.

home. In order to avoid hæmorrhage it is necessary to make traction very slowly ; two hours or more should be consumed in the operation. With this instrument I have removed large masses of hypertrophied tissue, not only from the posterior nares but the anterior nares as well ; and obtained eminently satisfactory results.

Retro-nasal adenoma can be scooped out with the currette as before suggested, or it can be destroyed with caustics or the galvano-cautery, but as their application requires some special skill I will not detain you with a description of the methods employed.

The question of hæmorrhage after excision of the tonsils has been much discussed of late. At the International Laryngological Congress held at Milan in 1881, several fatal cases from hæmorrhage after removal of the tonsils with the guillotine were reported, and several throat specialists of large experience frankly avowed

their unwillingness to remove these glands with cutting instruments. On the other hand, one surgeon in New York reports having removed several thousand tonsils with the bistoury and guillotine, without a fatal hæmorrhage, and but two cases that required vigorous treatment to check the bleeding.

I have used cutting instruments in performing this operation in a very large number of cases, and have never had to use more active measures than sipping ice-water. Judging, however, from the experience of others, this operation, while not often serious, is not always as simple as many writers on this subject would have us believe. Several cases of alarming hæmorrhage following removal of the tonsils with the bistoury have been reported by Dr. Lefferts, in which, after removing the clots, the source was found to be a large artery cut across, the bleeding from which resisted astringents and pressure, but was immediately checked when the artery was caught in forceps and twisted. In performing this operation I use a dulled guillotine, as with it the tissues are less cleanly divided than with a sharp instrument.

As injury to the palato-glossal fold is one of the chief causes of hæmorrhage in this operation, and as it is often found firmly attached to the tonsil, a bent probe should always be introduced between it and the tonsil, and the adhesions broken up before the tonsil is removed. Sore throat following tonsillotomy is usually due to injury of this fold.

As enlarged tonsils are likely to atrophy at puberty, when they are present in children and give little or no inconvenience, I believe it good practice to leave them with this hope.

When dryness of the throat is caused by sleeping with the mouth open, if the nasal passages are found to be sufficiently large to supply the lungs with air, the mouth should be kept closed by wearing a skull-cap with strings or straps fastened to its sides, which being tied or buckled under the chin, hold the jaws together.

